This question paper contains 3 printed pages.

3623 *Your Roll No.* .....

M.Sc. / IV Sem. A

Paper – GLG–404 (v) : Applied Hydrogeology

(Admissions of 2009 and onwards)

Time : 3 hours *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any five questions.
All questions carry equal marks.

1. Write a hydrogeological note on *arid zone* of India with a reference to aquifer characteristics and ground water quality.

2. Explain any *two* of the following:

   (*i*) For areas with uniform groundwater flow, the sectors having wide watertable contours and flat gradients indicate high permeabilities.

   (*ii*) Both the Darcy's law and Dupuit's assumptions fail to define the complete path of unconfined flow.

   (*iii*) Hydrochemical evolution can be better understood on *expanded Durov diagram* than that on Hill-piper diagram.

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3. How can the MODFLOW software (General Finite-Difference Flow Package) be employed to predict the aquifer yield?

4. Critically comment on the following:

   (*i*) Both the storativity and transmissivity decide the aquifer potential.

   (*ii*) Specific capacity is more effective well performance parameter than other aquifer parameters in terms of well yield.

5. Write a detailed note on aquifer characteristics of Marginal Gangetic Alluvium in southern part of Uttar Pradesh. Briefly describe the methods involved in estimation of aquifer parameters.

6. Draw the labelled diagrams for the following:

   (*i*) Jacob's plot showing locations of barrier and recharge boundaries

   (*ii*) Leaky confined aquifer

   (*iii*) C-S diagram.

7. Write short notes on any *four* of the following:

   (*i*) Ranny collector well

   (*ii*) Schlumberger configuration for electrical resistivity survey

(*iii*) Neutron log

(*iv*) $\nabla^2 h = 0$

(*v*) Chebotareb sequence.

8. Write the explanatory notes on any *two* of the following:

(*i*) Resistance-capacitance network

(*ii*) Management of coastal aquifers in perspective of catastrophes like Tsunami

(*iii*) Recession constant of a river hydrograph.